SWBAT

be prepared to finalize their cart friction project

Sep 4-7:31 AM

SECA CP Physics
Monday 29 February 2016

Welcome!!!

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Room C-244

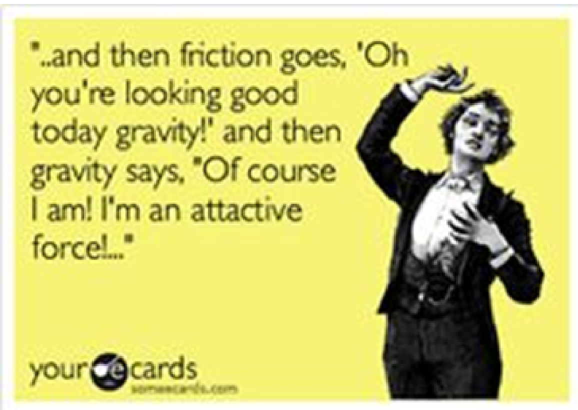
Centering (jokes)

- Show me SchoolView if you want phone in class...
- GET A COMPUTER and log in
- Hmwk: FINAL PROJECT is due MONDAY!!!!!

Opening Activity - Quick Write:

If I have a displacement vector of size 31 meters going 35 deg North of East, how do we find d_x and d_y?

(Ever heard of SOH CAH TOA? How would that work on this triangle?)



Sep 7-7:04 AM

State the Challenge

We are trying to figure out what the friction of the cart is, we had a pulley which was attached to the table, we had a timer which told us the time of when it stopped we had the string attached to the cart and we had weights which was being sat inside the cart along with slo-pro to slow down what and how it stopped or started.

MATERIALS

- > Cart
- > Pulley
- > Rope
- > Weights
- > Timer
- > Slo-Pro app

Method:

One person held the cart with the mass at its farthest displacement away from the end of the pulley.

Then we marked where the starting point was with a piece of tape.

At the end string there we attached a weight to pull.

Then another person gets ready to stop the cart right when it hits the end of the pulley system.

One more person sets up the Slo-Pro App and the timer.

The same person starts the timer and Slo-Pro then signals the person holding the cart to let go when they are ready.

Then after the cart started going the other person waiting for the cart to stop: stops it when the cart hits the end of the pulley system.

Afterwards, we look back at the Slo-Pro app and get the times the cart was let go and the time the cart hits the end of the pulley system.

Data:

Displacement: 69.7 cm

Velocity Initial: 0 m/s

Mass in cart: 1000 g

Trials	Release Time	Stop Time	Change in Time
3	3.3 sec	7.8 sec	4.5 sec
4	3.9 sec	7.7 sec	3.8 sec

Assumptions:

We assumed the table was smooth and the equipment would have high consistency.

We used UAM equations in our results, so we are assuming the acceleration is __________.

Results:

EACH CALC:
- WHAT YOU PUT IN
- WHAT EQUATION
- WHAT YOU GOT OUT

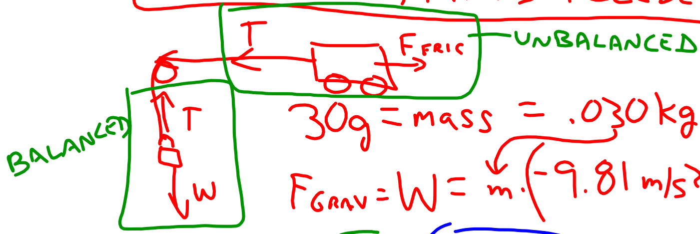
GLOSSARY
- MASS
- ACCELERATION
- FRICTION

Feb 26-9:09 AM

Pg 66?

Look at page 65 - how does knowing "a" (ACCELERATION) help you find friction?

NET FORCE MAKES ACCELERATION



30g = mass = .030 kg

$F_{GRAV} = W = m \cdot (-9.81\ m/s^2)$

$W = -T = .2943N$

$[F_{NET} =]\ T - F_{FRIC} = m_{CART} \cdot a$ ← (TEMPLATE)

m_{CART}: 1.1016 kg

$0.2943N - F_{FRIC} = 0.089164198\ N$

$+F_{FRIC} \qquad + F_{FRIC}$

$0.2943N = 0.089164198N + F_{FRIC}$

$-.0891649\ldots N \qquad -.0891\ldots N$

Quick circle - collaboration?
in YOUR words...

Feb 24-8:21 AM

What we should have solid:

Memorize our ~~5~~ 8 vocab cards, units, vector or not, definition, formula

Be able to answer distance vs displacement questions

Be able to make measurements of real-life motion. Know what is likely to make timing things difficult and how to get more reliable timing results

Be able to convert between miles and meters, between hours, minutes, and seconds

Be able to calculate speed = dist/time and velocity = disp/time

Know what all of the symbols in the UAM equations stand for and mean

Be able to turn a UAM word problem into a list of knowns and unknowns

Be able to pick the equation with those 4 things in it

Be able to put the knowns into that equation

(Be able to solve for the unknown)

→ PROJECTILES: V_x IS CONSTANT ; V_y CHANGES $a_y = -9.81 m/s^2$ PG 42

PG 43 TIME, Δt, CONNECTS X & Y

PG 49 VECTORS INTO X & Y, ADD VECTORS
SOH-CAH-TOA

PG 59 DIFFERENCE BETWEEN MASS & WEIGHT

PG 61 NET FORCE

PG 63 FREE BODY DIAGRAMS

$$F = m \cdot a$$

QW every day to review - gather responses to front board.

Dec 4-9:15 AM

InterActive Notebook - Table of Contents

Unit____ Chapters____ Date____

Sep 5-9:09 AM

FRICTION PROJECT CHALLENGE

IF BY (MON 2/29)

- ALL PEOPLE w/ 2^+ DAYS ATTENDANCE PER WEEK
- GET > 60% (PASSING) BASED ON PROJECT RUBRIC

THEN CLASS PIZZA PARTY @ LUNCH TIME ($2/PERSON)

Feb 12-10:02 AM

PG 65 FINDING FRICTION ON CAR

Things we know: $F = m \cdot a$

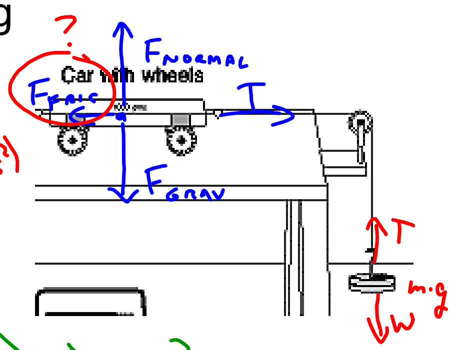
$F_{grav} = W = m * a_g$

Puller m = 50 g $\times \frac{1\ kg}{1000\ g} = .050\ kg$

Chunk m = 1000g = 1 kg

Cart m = 101.6g

$F_{GRAV} = (m_{CAR} + m_{CHUNK}) \cdot (-9.81\ m/s^2)$



Measure:

- distance on table
- time to travel from rest → a = ?

NEWTON'S 1ST LAW:
- OBJECTS KEEP DOING WHAT THEY WERE DOING UNLESS THERE IS A NET FORCE

NET FORCE → MAKES CAR ACCELERATE

Feb 11-10:19 AM

PG 64-65

What do we want to know about the motion of our cart? How can we get the best possible answer?

(Blue = thoughts before measruing)

- STOP WATCHES = LET CAR GO ?
- → [SloPro INSTEAD] x2?
- AS MUCH DISTANCE AS POSSIBLE
- LIGHTEST MASS THAT accelerates 30g
- MAKE SURE CART IS STRAIGHT

(black = thoughts while measuring)

- MARKED BEGINNING WITH TAPE, BUT IT ADDED FRICTION & CART DIDN'T MOVE, SO MOVED TAPE OVER
- HARD TO TOUCH/STOP CART EXACTLY AT BACK END

TRIAL 1: 76 cm, 20g
$t_1 = 2.9$ s. $t_2 = 9.4$ s.

TRIAL 2: 76 cm, 20g
$t_1 = 3.3$ sec $t_2 = 8.7$ s.

WHY NOT THE SAME?
$(9.4 - 2.9) =$ $\Delta t = 6.5$ s.
$(8.7 - 3.3) =$ $\Delta t = 5.4$ s.

TRIAL 3: 69.7 cm, 30g
$t_1 = 3.3$ s. $t_2 = 7.8$ s.

DELTA → "CHANGE IN" $t_2 - t_1$ SUBTRACT

$\Delta t = 4.5$ s.

TRIAL 4: 69.7 cm, 30g
$t_1 = 3.9$ s. $t_2 = 7.7$ s.

$\Delta t = 3.8$ s

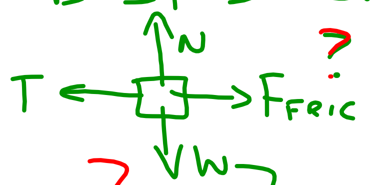
AVERAGE $\Delta t = 4.15$ s.

Feb 18-8:03 AM

"WHAT'S THE FRICTION FORCE?"

What are the big physics ideas we need to get the answer for the class project???

FREE BODY DIAGRAM



DATA
- TIME
- MASS
- DISTANCE
- $g = -9.81$ m/s²

$F = m\,a$?

W → $W = m \cdot g$

WHAT CAUSES a? UNBALANCED/NET FORCES

UAM: EQUATIONS THAT CONNECT

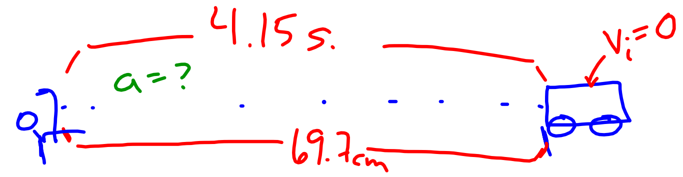
Δx, V_i, V_f, Δt, a

V_i = 0 m/s

Feb 22-7:54 AM

Finding acceleration using the UAM template

b)



c) $v_i = 0$ m/s

$a = ?$

CHANGE IN → $\Delta x = 69.7$ cm $= .697$ m

CHANGE IN → SUBTRACT → $\Delta t = 4.15$ s.

d) $\Delta x = v_i \cdot \Delta t + \frac{1}{2} a \Delta t^2$

e) CONVERT?

$? \text{ m} = 69.7 \text{ cm} \times \frac{1 \text{ m}}{100 \text{ cm}} = .697 \text{ m}$

$.697 \text{ m} = 0 \text{ m/s} \cdot 4.15 \text{ s} + \frac{1}{2}(a)(4.15 \text{ s})^2$ → 0

$\frac{.697 \text{ m}}{8.61125 \text{ s}^2} = \frac{(8.61125 \text{ s}^2) a}{8.61125 \text{ s}^2}$

$\text{m/s}^2 = a$

Feb 22-9:51 AM